1) A car travels with a velocity of 140 km/hr east for 4.75 hr. What is the displacement of the car?

$t\left(\bar{v}\right) = \left(\frac{\bar{d}}{t}\right)t$

$\bar{v} = 140\ km/hr\ east$

$t = 4.75\ hr$

$\bar{d} = ?$

$\bar{d} = \bar{v}\,t$

$= (140\ km/hr\ east)(4.75\ hr)$

$= 665\ km\ east$

2) A different car travels with a velocity of 48 m/s north for 800m. How long did the car travel?

$t\left(\bar{v}\right) = \left(\frac{\bar{d}}{t}\right)t$

$\bar{v} = 48\ m/s\ north$

$\bar{d} = 800\ m\ (north)$

$t = ?$

$t\bar{v} = \bar{d}$

$t = \frac{\bar{d}}{\bar{v}}$

$= \frac{800\ m\ north}{48\ m/s\ north}$

$= 16.6\ s$

Acceleration

Units:

initial velocity ($\bar{v}_i$) → m/s

final velocity ($\bar{v}_f$) → m/s

initial time (t_i) → s

final time (t_f) → s

acceleration ($\bar{a}$) → m/s/s or m/s^2

Equation:

$$\bar{a} = \frac{\bar{v}_f - \bar{v}_i}{t_f - t_i}$$

$t_i = \emptyset$ s (almost always)

You are driving from school to home and your velocity goes from 10 m/s to 40 m/s in 5 seconds. What is your acceleration?

$$\bar{a} = \frac{\bar{v}_f - \bar{v}_i}{t_f - t_i} \quad t_i = 0$$

$$= \frac{40\ m/s - 10\ m/s}{5\ s}$$

$$= \frac{30\ m/s}{5\ s}$$

$$= 6\ m/s^2$$

$\bar{a} = ?$

$\bar{v}_i = 10\ m/s$

$\bar{v}_f = 40\ m/s$

$t_i = 0\ s$

$t_f = 5\ s$

If a football is thrown from rest with an acceleration of 8.5 m/s^2 and has a final velocity of 25 m/s, how long was the football accelerating?

$$\bar{a} = \frac{\bar{v}_f - \bar{v}_i}{t_f - t_i}$$

$$\bar{a} = \frac{\bar{v}_f}{t_f}$$

$$t_f = \frac{\bar{v}_f}{\bar{a}}$$

$$= \frac{25\ m/s}{8.5\ m/s^2}$$

$$= 2.9\ s$$

$\bar{a} = 8.5\ m/s^2$

$\bar{v}_i = 0\ m/s$

$\bar{v}_f = 25\ m/s$

$t_i = 0\ s$

$t_f = ?$